

CLAIMS:

The invention claimed is:

1. An article stacking apparatus, comprising:
a barrel;
a frame configured to support the barrel for rotation in a recumbent position;
a motor; and
a drive mechanism coupling together the frame and the motor to rotate the barrel to agitate cups within the barrel for stacking into accumulated configurations.
2. The article stacking apparatus of claim 1 further comprising a plurality of protuberances provided on an inner surface of the barrel operative to agitate thermoformed open-mouth articles deposited within the barrel from a thermoforming operation to encourage stacking of the articles.
3. The article stacking apparatus of claim 2 wherein each protuberance is provided by a rod affixed along the inner surface of the barrel.
4. The article stacking apparatus of claim 3 wherein a plurality of the rods extend in a helical array within the barrel.
5. The article stacking apparatus of claim 1 wherein, responsive to rotation of the barrel, the helical array of rods interact with articles in the barrel to drive the accumulating articles from an entrance end to an exit end of the barrel.

6. The article stacking apparatus of claim 5 further comprising a pneumatic conveyor provided adjacent the exit end configured to deliver a stream of air toward the entrance end to urge individual, unstacked articles toward the entrance end.

7. The article stacking apparatus of claim 6 wherein the pneumatic conveyor comprises a fan and an air duct configured to eject a stream of air in an upstream direction within the barrel.

8. The article stacking apparatus of claim 1 further comprising an entrance chute provided at the entrance end of the barrel.

9. The article stacking apparatus of claim 8 wherein the entrance chute slopes downwardly into the barrel.

10. The article stacking apparatus of claim 1 further comprising a stacked article conveyor provided adjacent the exit end of the barrel.

11. The article stacking apparatus of claim 1 wherein the frame supports the barrel for rotation about a horizontal axis.

12. A cup stacking device, comprising:
a bin having a concave portion configured to support cups;
a frame configured to support the bin in a recumbent position for pivotal motion of the concave portion;

a motor; and

a drive mechanism coupling together the frame and the motor to pivot the bin to manipulate orientation of the cups within the bin to stack the cups.

13. The cup stacking device of claim 12 wherein the bin comprises a cylindrical drum, and the concave portion comprises an inner cylindrical surface of the drum.

14. The cup stacking device of claim 13 wherein the drum is rotated about a central axis of the drum.

15. The cup stacking device of claim 14 further comprising a plurality of projections extending radially inwardly of the inner surface of the drum and configured to interact with articles being tumbled in the drum to impart agitation of the articles and encourage nesting together of the articles into stacks.

16. The cup stacking device of claim 15 wherein each projection comprises a rod affixed to the inner surface of the drum.

17. The cup stacking device of claim 16 wherein the rod is configured in a helical configuration within the drum.

18. The cup stacking device of claim 17 wherein, responsive to rotation of the drum, the helical configuration of rods operate as impellers of an Archimedes screw to

drive stacks of articles within the drum from an entrance end of the drum to an exit end of the drum.

19. The cup stacking device of claim 12 further comprising an article conveyor communicating with an exit end of the tumbler and operative to move stacks of articles retrieved from the exit end of the drum.

20. The cup stacking device of claim 19 wherein the tumbler comprises a drum carried for rotation and having an array of helical rods provided on an inner surface of the drum operative to agitate articles within the drum to encourage stacking of the articles, and further operative to drive the articles and stack of articles from an entrance end to an exit end of the drum.

21. The cup stacking device of claim 20 further comprising an pneumatic conveyor provided adjacent the exit end of the drum and configured to entrain and move individual articles from the exit end toward the entrance end for further agitating and stacking.

22. The cup stacking device of claim 13 wherein the drum is recumbent with a horizontal, central axis.

23. A method for stacking articles, comprising:
providing a recumbent drum;
delivering stackable, open-mouthed articles into the drum; and

pivoting the drum so as to present the articles along a rolling inner surface of the drum to encourage stacking of the articles.

24. The method of claim 23 further comprising providing projections along an inner surface of the drum, and while pivoting the drum, agitating the articles by impinging the articles against the projections to further encourage stacking of the articles responsive at least in part to the agitation.

25. The method of claim 24 wherein the projections comprise a helical array of rods affixed to the inner surface of the drum.

26. The method of claim 24 further comprising moving the articles from an entrance end toward an exit end of the drum at least in part impinging the articles against the helical array of rods.

27. The method of claim 26 further comprising generating a stream of air from the exit end toward the entrance end of the drum to encourage movement of individual articles and relatively small stacks of articles from the exit end toward the entrance end for further agitation and stacking.

28. The method of claim 23 wherein pivoting comprises rotating the drum.

29. The method of claim 24 further comprising conveying stacks of the articles from the drum to a collection device.

30. The method of claim 23 further comprising rotating the drum to roll articles in the drum to stack the articles.

31. The method of claim 30 further comprising agitating the articles while rotating the drum to further encourage stacking of the articles.

32. A method for stacking open-mouthed articles, comprising:
providing a reclining barrel;
accumulating open-mouthed articles in the barrel; and
rotating the barrel to manipulate orientation of the articles to stack the articles.

33. The method of claim 32 further comprising providing projections extending radially inward of an inner surface of the barrel, and agitating the articles by engaging the projections with the articles while rotating the drum.

34. The method of claim 32 wherein the barrel is supported along a horizontal axis.

35. The method of claim 32 further comprising providing a helical array of projections on an inner surface of the barrel, and moving the articles from an entrance end towards an exit end in response to the helical array of projections engaging the articles as the barrel rotates.

36. The method of claim 35 further comprising providing a pneumatic conveyor adjacent an exit end of the barrel, and further comprising moving individual articles and relatively small stacks of articles from the exit end towards the entrance end of the barrel using a stream of air generated by the pneumatic conveyor.